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Non-Local Damage Modelling of Sheet Metal Forming Processes with ALE Formulation

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Abstract. The modelling of material degradation due to nucleation, growth and coalescence of micro-voids is vital in sheet metal forming process due to the large deformation typically experienced by the part. Nonlocal damage modelling or nonlocal continuum is gaining a lot of interest because it is an effective approach to modelling the strain-softening, whilst avoiding the spurious localization that gives rise to strong mesh sensitivity in numerical computations. However to accurately resolve the evolving narrow bands of highly localised strain, it is necessary to use sufficient computational grids. In this paper an ALE formulation is used for modelling the localization pattern. An approach for relocating the node points is presented and explored.